

Standard Operating Procedures for Latent Print Processing with Ninhydrin

1 Scope

Ninhydrin is used by latent print personnel to develop prints on porous and semi-porous surfaces. It reacts with the amino acids that are present in perspiration.

2 Equipment/Materials/Reagents

Beakers or graduated cylinders

Balance

Spatula

Squirt bottles, sprayers, brushes, or glass trays

Dark bottles

Magnetic stirrer and stir bar(s)

Humidity chamber or steam iron

Ninhydrin

Acetone

Petroleum Ether

Isopropanol

Methanol

Fume hood

3 Standards and Controls

Not applicable.

4 Sampling or Sample Selection

Not applicable.

5 Procedures

5.1 Solution Preparation (Petroleum Ether)

5.1.1 Large Quantity Solution Preparation

a) Ninhydrin stock solution

Combine:

- Ninhydrin – 700 g
- Methanol – 3500 mL

Stir until Ninhydrin dissolves.

b) Ninhydrin working solution

Remove 1500 mL of Petroleum Ether from the approximately 20 L container.

Combine:

- Isopropyl Alcohol – 800 mL
- Ninhydrin stock solution – 700 mL

Add to the remaining Petroleum Ether in the approximately 20 L container.

Agitate container to mix solution.

5.2 Solution Preparation (Acetone)

Ninhydrin working solution

Combine:

- Ninhydrin - 6 g
- Acetone - 1000 ml

Stir until Ninhydrin dissolves.

5.3 Application

5.3.1 Standard Method

a) Apply solution to specimen.

b) Allow specimen to dry completely.

c) Place in humidity chamber at 70%-80% relative humidity and 70-80°C for approximately 5 minutes or until desired development occurs.

d) For digital capture and photography, see FBI Latent Print Units Processing Manual Preamble.

5.3.2 Alternate Methods

- a) Apply damp heat with steam iron for several minutes. If latent print development is insufficient, continue to apply damp heat for a few additional minutes.
- b) In some circumstances heat may be detrimental to the condition of the specimen(s). In these circumstances the specimens(s) may be left to dry and then placed in a sealed bag or container until development has occurred.

Note: The use of alternate methods must be recorded.

5.4 Storage

- a) Ninhydrin stock solution must be stored in a dark glass bottle.
- b) Ninhydrin working solution may be stored in any of the following receptacles:
 - Dark glass bottle
 - Metal can
 - Stainless steel container

5.5 Shelf Life

- a) Ninhydrin stock solution has an indefinite shelf life provided the reagent checks are satisfactory.
- b) Ninhydrin working solution has a shelf life of 1 year provided the reagent checks are satisfactory.

5.6 Reagent Checks

See FBI Latent Print Units Processing Manual, Preamble.

6 Calculations

Not applicable.

7 Measurement Uncertainty

Not applicable.

8 Limitations

Not applicable.

9 Safety

See FBI Laboratory Safety Manual for appropriate information.

10 References

FBI Laboratory Safety Manual, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

FBI Latent Print Units Processing Manual, Preamble, Federal Bureau of Investigation, Laboratory Division. Latest Revision.

Oden, S. and von Hofsten, B. "Detection of Fingerprints by the Ninhydrin Reaction". *Nature*. 173:449.

Petruncio, A. V. "A Comparative Study for the Evaluation of Two Solvents for Use in Ninhydrin Processing of Latent Print Evidence". *JFI*. 50(5):462.

Trozzi, T. A., Schwartz, R. L., and Hollars, M. L. *Processing Guide for Developing Latent Prints*, FBI Laboratory, Washington DC, 2001.

Rev. #	Issue Date	History
0	01/13/14	Original document issued. Derived from Discontinued Latent Print Operations Manual, Standard Operating Procedures for Processes Used to Develop Latent Prints. The original LPU Processing Manual consisted of a single document with a preamble and procedures for all processes. The current document separates each into its own separate document. This document combines Procedures for Ninhydrin (Acetone Base) and Ninhydrin (Petroleum Ether Base).
1	??/??/??	Specific section numbers referenced in Preamble removed throughout document. Section 1, latent print personnel added. Section 4 removed and remaining renumbered. Titles for Section 4 and Section 7 modified. Section 9, generalized. Updated for Biometrics Analysis Unit. References Updated. Abbreviations addressed.

Approval

Redacted - Signatures on File